

### **REMARKS**

Please reconsider the application in view of the following remarks. Applicant thanks the Examiner for carefully considering this application.

#### **1. Disposition of Claims**

Claims 1-15 are pending in this application. Claim 1 is independent. The remaining claims depend, directly or indirectly, from claim 1.

#### **2. Rejection(s) under 35 U.S.C § 103**

Claims 1-15 were rejected under 35 U.S.C. § 103(a) as being obvious over Fraivillig (U.S. Patent No. 6,015,607) ("the Fraivillig '607 patent") in view of Hoffmeyer (U.S. Patent No. 5,757,073). This rejection is respectfully traversed.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). *See also*, M.P.E.P. § 2142.

The present invention relates to methods for manufacturing a flexible printed circuit bonded to a heat sink using a process that includes two bonding steps. Embodiments of the invention use an adhesive that is capable of being *partially activated to form a tack-bond*. In the first step, such adhesive layer is tack-bonded to a printed circuit layer, and in the second step, the adhesive layer is fully-activated to bond to a heat sink (and the circuit layer). A key feature is that the adhesive layer *remains partially activated* during the process, until it is fully activated to bond to the heat sink.

A method, as recited in claim 1, includes the following limitations: "in a first bonding step, adhering a conductive layer to a first surface of a bond film using a first adhesive layer to produce a circuit substrate, wherein the adhering is achieved by *partially activating the first adhesive layer such that the conductive layer is tack-bonded to the bond film*; after the first

bonding step, processing the circuit substrate to produce the flexible printed circuit; and after the circuit substrate is processed, laminating the heat sink to a second surface of the bond film of the flexible printed circuit, in a second bonding step, using a second adhesive layer.”

In contrast, the Fraivillig ‘607 patent discloses *single-step methods* for making flexible laminates using a polyetherimide or a siloxane polyetherimide copolymer. (Abstract). The Examiner cites Fig. 3, Col. 5 lines 60-67, and Col. 6, lines 1-26, as providing a teaching of “partially activating the first adhesive layer such that the conductive layer is tack bonded to the bond film.” Applicant respectfully disagrees.

Fig. 3 and the cited text in Fraivillig ‘607 patent show a platen press process for laminating printed circuit in a batch mode. There is no teaching of “partial activation” or “tack bond.” The polyetherimide and siloxane polyetherimide used in the Fraivillig ‘607 patent *cannot* be partially activated to achieve tack-bond because they will be fully cured upon activation. In fact, these polyetherimide and siloxane polyetherimide layers are fully-cured at all times, even before coating on the film.

In addition to the lack of teaching of partial activation and tack bond, Fraivillig ‘607 patent also fails to teach a two-step method. Examiner relies on Hoffmeyer to provide the two-step teaching. However, Hoffmeyer discloses a method of facilitating rework of an electronic component – the component is adhered to a thin metal foil surface that is pre-bonded with adhesive to the heat sink. The component can then be removed without damaging the surface of the heat sink. Hoffmeyer does not teach a two-step process that involves *partially activating an adhesive to form a tack-bond* in the first step.

Thus, Fraivillig ‘607 patent teaches the manufacturing of flexible printed circuits, while Hoffmeyer teaches rework of electronic components. There is no suggestion or motivation in these references that it would be desirable to combine their teachings. Assuming *aguedo* that these two references are properly combinable, a combination of these two references still will not teach all limitations of claim 1 because Hoffmeyer fails to teach that which is missing in Fraivillig ‘607 patent, i.e., “partially activating” and “tack bond.”

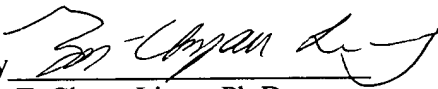
Because there is no motivation to combine Fraivillig ‘607 patent and Hoffmeyer and a combination of these two references does not teach all limitations of claim 1, claim 1 is patentable over these two references. Claims 2-15 depend, directly or indirectly, from claim 1 and, therefore, are patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested

**Conclusion**

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 07009.011002).

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Respectfully submitted,

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